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ABSTRACT

This report describes the design and results of a survey reviewing European research activities in the field of reflective teaching theories and the use of telecommunications technologies in teacher education. The project also has the goal of identifying possible partners for participation in future collaborative research that will enhance the quality and European dimension of current research. An overview is provided of the theoretical framework regarding reflection and teleguidance with a literature review on the uses of telematics for the promotion of reflective practice in teacher education. The design and results of a survey of practice regarding actual use of telecommunications technology in teacher education are presented. The survey was sent to teacher education institutions in the European Union member states and in Iceland, Norway, and Switzerland. Preliminary results based on 64 responses representing 16 countries showed that 10 percent of the teacher education institutions are interested in the use of telecommunications for stimulation of reflection. (Contains 65 references.) (JLS)

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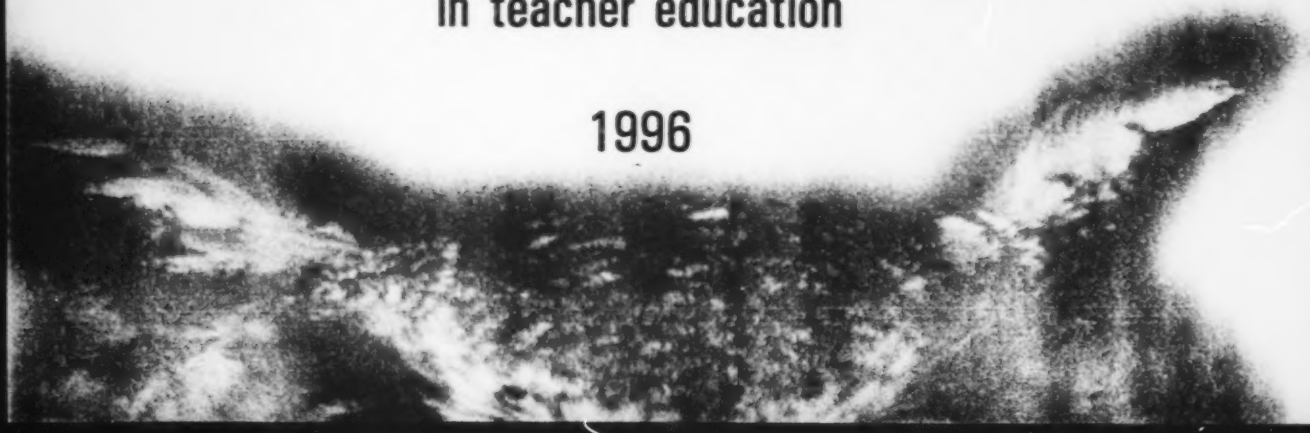
REFLECTION AT A DISTANCE

An inventorial study into reflection and teleguidance in teacher education

1996



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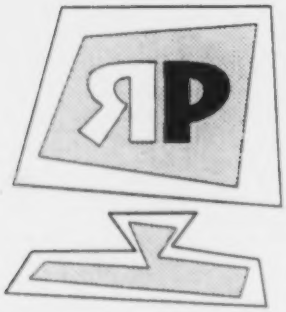

REFLECT - PROJECT

REFLECTION AT A DISTANCE
An inventorial study into reflection and teleguidance in teacher education

1996

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1 Introduction

This report is the second product of the REFLECT project, in which four European universities collaborate on the use of teletutoring to promote reflection in teacher education. The partners in this project are the Universities of Utrecht, Exeter, Trondheim and Barcelona.

The report describes the design and results of an inventorial study aiming at:
- providing a 'state of the art' overview of European research activities in the field of reflection theories and telecommunications technologies in teacher education.
- broadening the network of researchers by spotting possible partners for participation in future collaborative research, in order to enhance the quality and the European dimension of the activities of the present project partners.

The major activities to achieve these aims have been a literature search on reflection and teleguidance and a survey among all European teacher education institutions.

Apart from this introductory chapter, the report consists of four chapters:

Chapter 2 gives an overview of the theoretical framework concerning reflection and teleguidance. The two main issues of reflection and telecommunications and their relationships, are discussed. This theoretical framework has served as a basis for a literature search and a European survey.

Chapter 3 describes the design and the results of the literature study into the uses of telematics for the promotion of reflection.

Chapter 4 presents the design and results of the survey. The aim of this survey was to make an inventory of initiatives focusing on the promotion of reflection by using telecommunications technology within other teacher education institutions than those involved in the REFLECT project. The scope of the survey has been broadened by adding questions concerning initiatives only relating to reflection *or* telecommunications. The questionnaire (see appendix 1 and 2) has been sent to teacher education institutions in the EU member states as well as to institutions in Iceland, Norway and Switzerland. On the basis of the survey we will present an overview of existing national and international research networks in the field of reflection and/or telematics, as well as opportunities for strengthening future collaboration between new partners within the field of interest.

Chapter 5 summarizes the major conclusions of the inventorial study.

2 Theoretical framework

In this section we discuss the theoretical framework of the inventorial study. In 2.1 we focus on the framework concerning reflection, in 2.2 we discuss the new educational tool, telematics.

2.1 Reflection and the promotion of reflection

The notion of reflection: the roots

A central issue in the REFLECT project is the use of teleguidance for the promotion of reflection in teacher education. In order to set up the inventorial study a theoretical framework was needed to guide our analysis. A first and important question was: what do we mean by reflection?

As Calderhead (1989), currently working at Bath University, puts it in his well-known overview, there is much confusion in literature about the precise meaning of the term reflection and the term is often poorly defined by researchers (see also Tom, 1985). Almost all researchers agree on the fact that reflection is a special form of thought (Grimmett, 1988; Sparks-Langer & Colton, 1991; Hatton & Smith, 1995) and that its origin can be traced back to the work of Dewey (1933), who warned against a too mechanical focus on teaching method in the preparation of teachers (Gore, 1987; Zeichner, 1982). Dewey emphasised that 'reflection involves not simply a sequence of ideas, but a *consequence* - a consecutive ordering in such a way that each idea determines the next as its proper outcome, while each outcome in turn leans back on, or refers to, its predecessors' (Dewey, 1933, p.4). In this respect, reflection entails a 'chain of thoughts which aim at a common end' (ibid. p.5). Dewey arrives at the following definition:

'Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends, constitutes reflective thought' (ibid. p.9).

Pollard & Tann (1995) identify six key characteristics in Dewey's notion of reflective action:

1. Reflective teaching implies an active concern with aims and consequences, as well as means and technical efficiency.
2. Reflective teaching is applied in a cyclical or spiralling process, in which teachers monitor, evaluate and revise their own practice continuously.
3. Reflective teaching requires competence in methods of classroom enquiry, to support the development of teaching competence.
4. Reflective teaching requires attitudes of open-mindedness, responsibility and wholeheartedness.
5. Reflective teaching is based on teacher judgement, which is informed partly by self-reflection and partly by insights from educational disciplines.
6. Reflective teaching, professional learning and professional fulfillment are enhanced through collaboration and dialogue with colleagues.

Particularly the sixth characteristic was a major incentive for the REFLECT project. Telematic facilities offer new and important opportunities for collaboration and

dialogue with colleagues or supervisors and thus for the promotion of reflective teaching.

Different conceptualisations

In spite of the common origin of many conceptualisations of reflection, which can be traced back to Dewey, modern views of reflection differ substantially, if made explicit at all. The terms reflection or reflective teaching are often ill-defined and seem to embrace a wide range of concepts and strategies (Hatton & Smith, 1995), which differ on a number of issues, one of which is the underlying philosophy of education (Korthagen & Wubbels, 1995). We present some examples.

In the approach which sees reflection as critical inquiry, advocated by such authors as Zeichner (1983), and Carr & Kemmis (1986), the objects of reflection are primarily the moral, ethical, political, and instrumental issues embedded in teachers' everyday thinking and practice. Established patterns used in teaching situations are not taken for granted, but are made explicit. It is fairly clear that these authors see a good teacher as a critical, inquiring professional. This view is linked to a specific view of the aims of education in schools, i.e. to make students critical, responsible citizens.

Ross (1987) relates reflection to rationality and responsibility; in her view reflection is a way of thinking about educational matters which involves the ability to make rational choices, and to assume responsibility for those choices. In this respect, she appears to see the teacher as a professional who is accountable for the way he or she teaches.

In the approach employed by Cruickshank et al. (1981), the object of reflection is the effectiveness of instructional strategies in attaining given ends. This technical approach is most probably based on a view of the teacher as a competent, highly technical person (see Gore, 1987), although the authors also state that the aim is to develop in students good habits of thought about teaching, so that they become wise as teachers. It is not clear what their underlying view of education is. It could be a technical and instrumental philosophy of education, which regards mastery of skills by the students as the primary aim of education.

For Schön (1983, 1987) reflection involves some form of experimentation, in which practitioners constantly interpret situations by means of problem-setting and problem-solving, a process which can lead to a reframing of the situation. Schön's descriptions do not make explicit his philosophy of education. It is conceivable that he stresses the experimental nature of good teaching, and does not attach a particularly high value to teachers' use of the theoretical underpinnings of their teaching.

Regardless of whether an author explicitly states his or her educational views, it is clear from the above examples that statements about the nature of reflection are linked to philosophies of education. This explains the wide variety of conceptualisations of reflection.

Only a few attempts have been made to operationalise and measure reflection (Wubbels & Korthagen, 1990; Korthagen, 1993a). There are hardly any studies which link reflective capacities to other teacher characteristics (Korthagen & Wubbels, 1995).

Aims of promoting reflection in teacher education

Calderhead and Gates (1993) state that teacher education programmes based on notions of reflective practice espouse one or more of the following aims:

- to enable teachers to analyze, discuss, evaluate and change their own practice, adopting an analytical approach towards teaching;
- to foster teachers' appreciation of the social and political contexts in which they work, helping teachers to recognize that teaching is socially and politically situated and that the teacher's task involves an appreciation and analysis of that context;
- to enable teachers to appraise the moral and ethical issues implicit in classroom practices, including the critical examination of their own beliefs about good teaching;
- to encourage teachers to take greater responsibility for their own professional growth and to acquire some degree of professional autonomy;
- to facilitate teachers' development of their own theories of educational practice, understanding and developing a principled basis for their own classroom work;
- to empower teachers so that they may better influence future directions in education and take a more active role in educational decision-making.

Apart from the confusion about the precise meaning of the term reflection, this variety of different possible aims contributes to the large number of possible approaches towards the promotion of reflection in teacher education.

Different approaches, theoretically and practically

There is yet another factor which makes the topic complicated. Many different psychological or educational theories underlying the use of reflection in teacher education are possible and useful. This becomes clear when, for example, one considers the theoretical underpinnings of the different approaches within the REFLECT project. One of the interesting results of the REFLECT project until now has been that the theoretical frameworks of the partners are getting more intertwined and that the partners have agreed on a common working definition as well as on a tool for promoting reflection in student teachers. Before turning to this common core of the REFLECT project, we will first describe the differences between the four partners with regard to aims of reflection and theoretical underpinnings.

The Utrecht approach

In the Utrecht approach reflection is seen as part of a problem solving process (Korthagen, 1985; Calderhead, 1989). In line with Schön (1983, 1987) the Utrecht teacher educators consider reflection to be related to experimentation, in which practitioners constantly interpret situations by means of problem-setting and problem-solving. The problem-setting and problem-solving process may take place within a group, during a supervisory conference, while writing a logbook, etcetera. Its essence is an attempt to structure or restructure an experience (Schön, 1983, 1987; De Jong & Korthagen, 1989; Korthagen, 1992).

Korthagen (1985) describes the process of reflection in terms of a spiral model, consisting of cycles of 5 phases (figure 1). In this model, phase 5 is the first step of a next cycle.

This ALACT model is the basis for a preservice teacher education programme aiming at the development of reflective teachers in the Netherlands. The programme has been the object of many research studies (Korthagen, 1985; Korthagen, 1988; Wubbels & Korthagen, 1991; Korthagen, 1993a).

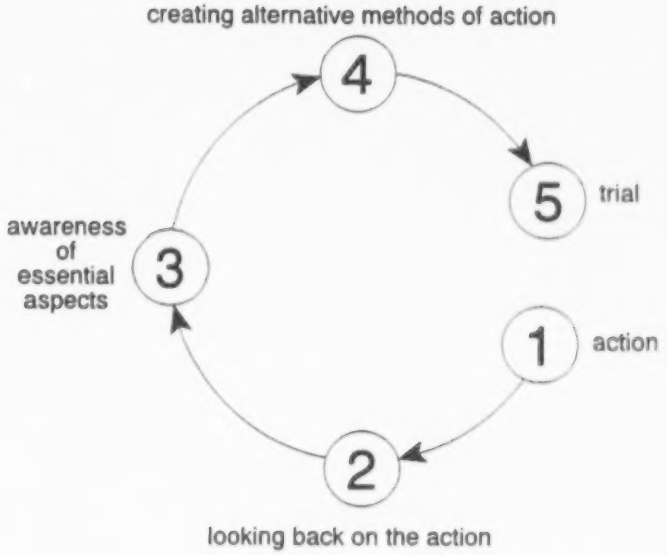

Figure 1: The ALACT-model

The Utrecht view is based on a system approach towards classroom communication (Watzlawick et al., 1967). Interaction processes in the classroom are considered to take place within a social system with at least two important components: the student teacher and the pupils/students. The behaviour of both the student teacher and the pupils is seen as being closely interrelated: the student teachers' behaviour is as much a reaction to the behaviour of the pupils as it triggers the pupils' next reactions (Wubbels, Créton & Holvast, 1988). This way of viewing classroom communication appears to be very helpful for teachers, as it facilitates their analysis of problems in the classroom. At the same time this way of reflecting about the interaction in the classroom is difficult to develop in student teachers, as they tend to be mainly focused on their own behaviour (Fuller & Bown, 1975). In order to develop their reflections, a scheme is used with 9 aspects (figure 2):

0. Context	
1. What did I want?	5. What did the pupils want?
2. What did I do?	6. What did the pupils do?
3. What was I thinking?	7. What were the pupils thinking?
4. How did I feel?	8. How did the pupils feel?

Figure 2: Aspects of reflection

The significance of this scheme lies in the relationships between the aspects, especially in the relationships between the two columns, as this relationship is essential within the system approach towards classroom communication. The final *aim*

of the promotion of reflection is that the student teacher is able to analyze such relationships without the help of the teacher educator, thus having the competence to analyze interaction problems in the classroom indepently of a supervisor.

The Barcelona approach

The Barcelona approach is based on a somewhat different theoretical basis, which finds its origins in the work of Habermas (e.g. 1974) and was further developed by Van Manen (1977). It implies the acceptance of a particular ideology, along with its accompanying assumptions and epistemology (Gore, 1987; Wildman & Niles, 1987; Zeichner & Liston, 1990; Hatton & Smith, 1995). Within this ideology the emphasis is on the degree to which teachers critically reflect on the moral, ethical, political and instrumental values embedded in their everyday thinking and practice (Zeichner, 1983, 1987; Valli, 1992).

Van Manen (1977) identifies three levels of reflection. At the first level (technical rationality) the dominant concern is with efficient means for attaining a given objective. At the second level it is assumed that every educational choice is based on a value commitment to some interpretative framework. Reflection at this level is concerned with analyzing and clarifying individual and cultural experiences, meanings, perceptions, assumptions, prejudgments, and presuppositions, for the purpose of orienting practical actions. On the third level, the fundamental question of the value of knowledge is posed. On this level reflection is focused on the nature of the social conditions necessary for raising the question of worthwhileness in the first place (cf. Noffke & Brennan, 1988).

In the Barcelona approach reflection is considered to be more important than action. The main *aim* is to teach students to be critical thinkers, make them reflect on themselves as teachers, also in relation to their teaching tasks within the political context of education. Teachers should become aware of their functioning within a political system that has specific values and ideologies which it wants to be transferred into children's minds. Thus, the kind of questions the teacher educator asks are very important as they can draw the student teachers' attention to views of education, views of pedagogy and even views of society. This can only be effective within a respectful and safe relationship between the supervising teacher educator and the student teachers. Within such a relationship the student teacher can become aware of their implicit notions of education, teaching and learning, reflect on their experiences, discover whether theory meets practice, and define the links between the subject content and the historical and ideological implications of each experience.

The Exeter Approach

The Exeter approach is based on a model of cognitive apprenticeship (Collins et al., 1988), which include four issues:

1. What teacher knowledge is to be taught to student teachers?
2. How is it to be taught?
3. How is the learning to be sequenced?
4. How is knowledge to be shared and negotiated?

Cognitive apprenticeship (Mandel & Prenzel, 1992) emphasises the following types of learning or strategic knowledge:
- The expert's heuristics - 'knowing how'
- Control strategies, especially monitoring and analyzing how one learns
- Adapting learning strategies in exploring new materials and extending and reorganising the knowledge base.

Teacher knowledge can be taught by the following strategies:
coaching, in which students are reminded of the important aspects, propositions are made and judged to be valid on evidence provided;
modelling, not only as teaching performance but also practice in describing, explaining and justifying actions, in conversations of instruction;
scaffolding, which refers to the whole of the help the tutor offers to support the learner in verbalising and externalising their thinking, represented in the Exeter model of instructional design and the criteria for argument;
articulation in argument, to examine student's principled pedagogical thinking, their practical reasoning;
critical discourse, that fosters comparisons between the learner's own learning strategies in justifying what they claim to have done and know.

Another theoretical basis on which the Exeter approach is built, is the work of Gal'perin (see for an overview Haenen, 1996). This has led to a learning cycle, located initially in actions, which are subsequently represented in speech and deep processing of information in terms of concepts and principles.
Learning is seen as operating through five stages (figure 3):

1. Creating a preliminary conception of the action	2. Taking practical action steps	3. Talking about the action and its implications	4. Internalising the routine and potential implications of the actions	5. Consolidating and understanding through incorporating ideas into practice
e.g. introduced to one of the skills of teaching	e.g. an episode of teaching is set and exercised	e.g. provoked structured conversation relating the episode to skills of teaching	exploring, with co-tutor and university tutor the nature of new understandings, performance and how these are subsequently routinised into a repertoire of practice	

Figure 3: Five stages of learning

The social context for learning is provided by the conference setting which tackles the inseparability of knowing and doing - that of ill-defined problems arising from authentic activity.
The social-communicative exchanges in conferences consist of:
- structured conversation directed by the student;
- description as a key element to inform dialogue through a shared picture of associations and causality among concepts and events.

The criteria for argument are used in two ways:

- to elicit what is often tutor's and teacher's implicit knowledge and to justify why it is thought to be strategic;
- to explicitly construct how an appropriate selection is or can be made from various knowledge-bases.

There is a development from simple levels of performance to more complex expressions of competence. This is achieved through 4 planned phases of development (figure 4):

Phase 1 Introduction	Phase 2 Moving towards autonomy	Phase 3 Autonomy	Phase 4 Working as a professional
The student working alongside the teacher, assisting and practising small episodes of teaching	Increasing student responsibility	Students planning independently and teaching whole lessons	Student operates as a fully autonomous member of the teaching profession

Figure 4: Four phases of professional development

The central *aim* of reflection is to provoke conversation with oneself and with settings. Settings are structured situations with others as an audience. The conversation requires authentic practice experience as well as breaks with experiences. Conversations are structured mental processes and include an intermental (dialogue) and an intramental dimension (personal reflection). Both dimensions are strongly interrelated.
On the one hand, the conversation with settings is a rehearsal for conversation with oneself, it helps to have conversations with oneself to reflect. On the other hand, conversation with self is a rehearsal for conversation with settings.

The Trondheim approach
Teacher educators at NTNU consider the internship of student teachers in schools as an apprenticeship where the student teacher goes out and work with an experienced teacher in a master-novice relationship. In this school based training, there are various teaching skills that can not be taught, but only learned by doing. Not just at a superficial level but in an interactive process of action and reflection, resulting in a internalisation of behavioural competencies. Learning teaching skills could be compared with learning a craft where there exists a close cooperation between the master and the apprentice. Although each discipline has its own values, their ethics are similar.
Communication about the experiences of student teachers in their schools is critical for the development of a 'teaching craft'. The *aim* of reflection is to promote such communication, both through written and spoken language.

The Trondheim approach is based on a theoretical basis developed by Vygotsky. He considers language as an important tool for thought and problem solving. Thought is not merely expressed in words, it comes into existence through them. The thought becomes explicit when it is expressed in language. Through language we are able to examine thought, clarify it, explore contexts and solve problems or discover lack of connections. Language is not only the most important mode of communication, but also the most important aid in structuring and examining our inner and outer world.

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Writing makes conscious, clarifies, saves the idea and makes it possible to develop it further, to restructure and discover new associations. It is a springboard for new ideas. Retrospective restructuring is very important with regard to the creation and maintenance of longer deliberations.

Inspired by Vygotsky, contemporary linguistic theory differentiated between two functions of language: language as a mode for thought and language as a mode for communication. It is important to keep in mind these two functions when one is using writing as a tool in developing thought. When one is writing to develop one's thoughts the receiver is oneself. Because of the exploratory nature of this kind of writing it will be fragmentary, spontaneous, and unfinished. When one is writing for someone else the aim is to communicate ideas, beliefs, and points of view. In this mode of writing, the text needs to have internal logic, be consistent and grammatically correct. The two different functions of language also represent different relationships to the most important stress factor for writing, namely a critical reader. The student teacher's writing on e-mail to the teacher educator will often be exploratory and unfinished, and not always grammatically correct.

Freewrite has a long tradition in process writing as a way to open up for inner resources and as a way to bring to the surface ideas that have been dormant for some time. Sometimes writing is a tool for introspection, self-discovery and therapy. Pennebaker (1991) claims about self expressive writing: 'It strongly encourages the expression of individual's very deepest emotions and thoughts about personal and, often, traumatic events and issues.'
Conceptualization, that means to find words to express feelings, to describe situations, to tell a story, may have a therapeutic effect. To write literal descriptions about a traumatic event can have a therapeutic effect, especially if one tries to put words on the emotions (Pennebaker, 1991). Through writing this 'something' escapes as if it was someone else's voice who talks through oneself.
Even though student teachers are not likely to have so dramatic experiences during teaching practice that they are in the need of therapy, this period is full of new impressions and experiences, both positive and negative. Many studies show that most beginning teachers go through a period of depression (Müller-Fohrbrodt et al., 1978). The whole teaching practice period of student teachers is characterized by insecurity, stress, uneasiness and fear of not being able to cope with the situation.
The student teachers should be introduced to the different functions of writing and they should be encouraged to use writing as a tool in sorting out impressions in the reflection process, not just with a **reader** in mind, but with **oneself** in mind. As they gain experience in this way of working, they in turn will eventually be able to encourage their students to use writing as a tool to develop feelings into ideas, gain new insights and understanding in relation to themselves and the world.
In writing, the author enters into two kinds of dialogue. One is the dialogue between the author's inner being and the words that are put down on paper. The other is between the author and an external reader.

Agreements on theory and working definition in the REFLECT project
As far as the definition of reflection is concerned it has become clear that the partners have interesting similarities in their views and activities related to reflection and that their theoretical perspectives are complementary to each other. Exeter, Trondheim and Utrecht even have much in common, whereas Barcelona contributes to the discussion

in having a more different scope. This difference with Barcelona stems from various elements such as the educational system for teacher education in Spain, the specific field of Arts Education and the political history of the Spanish partner.
Due to the collaborative involvement of all participants, the partners have gone far beyond an exchange of ideas. The sharing of the different theoretical perspectives has led to an important result of the Kick-off Meeting in January 1996, viz. an agreement of the four partners on a definition of reflection for the REFLECT project. This definition, developed by De Jong and Korthagen (1989) is:
Reflection is the mental process of trying to structure or restructure an experience, a problem or existing knowledge or insights

In the light of the confusion in the research literature on the definition of reflection, this agreement within the REFLECT project can be seen as a major step forwards.
The partners also agreed on the usefulness of the ALACT model (see above) as a possible tool for the development of reflective skills of student teachers. One of the goals of the REFLECT project is the study of the usefulness of such tools in teleguidance. Within the project the ALACT model is currently also used as the basis of an instrument for measuring the quantity and quality of student teachers' reflections.

Tools and strategies for promoting reflection
Many different tools and strategies for promoting reflection in teachers or students in teacher education can be found in the literature. They can be categorized within five major types:

1. *The use of models as a tool*
The objective of this type of strategies is to support the student teachers by using some kind of model. An example of such an approach is the use of the ALACT-model. In this model the reflection process is divided into several phases and each of these phases is worked out in detail. From the viewpoint of reflection the third phase, awareness of its essential aspects, is the most relevant one. Student teachers have to acknowledge which attitudes or behaviour are typical to their way of teaching.

Also other theoretical models, for example models about learning or classroom management, can be used to help teachers relate theory and practice (see for example Wubbels & Levy, 1993). Establishing the relationship between theory and practice requires reflection on the part of the teacher.
Conceptual mapping is an other example of the strategy of using models, in this case a model generated by the student teachers themselves. A reconstruction of the mental structure of the student teacher is made and used for further development.

2. *Externalisation*
A frequently mentioned tool to stimulate externalisation is to give student teachers the task to record their ideas and experiences in a logbook or diary. It depends on the supervisor whether he or she gives the student teacher specific instructions how to use the logbook. According to Korthagen (1985, 1995) structured logbook writing offers a means of monitoring the development of reflective competencies of the student teacher. He describes this activity as meta-reflection. Thomas (1995) characterizes this form of writing as collaborative accounts referring to the interaction between the student teacher and his supervisor. Another form of writing he distinguishes is

autonomous writing, which is the spontaneous and unaided narrative of an individual teacher.
Discussion with fellow student teachers is another externalisation instrument. Depending on the objective, different combinations are possible such as dyads, triads or group discussions.

3. *The use of stimuli*
Systematic questioning by a supervisor is an example in this category. Another example is the use of video recordings of lessons of experienced teachers.
In this category, the following techniques described by Korthagen (1992, p. 267-269) can be put: the wall, columns, the repertory grid and arrows. The wall is an instrument to activate student teachers to explicate their goals and values. The colums is a means for clarifying the relation between educational goals of student teachers and their actual teaching behaviour. The repertory grid is focused on relationships between teacher behaviour and pupil characteristics. Arrows is meant to deepen the insight into the relationship between goals, pupils characteristics and teaching strategies.

4. *Mirroring*
One can "mirror" actual teaching situations in which the student acted as a teacher, by means of audio or video recordings which can be analyzed and/or discussed afterwards.

5. *Imaging*
Examples in this category are photography, drawing and the use of metaphors. The purpose is that the student teachers create an image of their situation. Such non-analytic techniques contribute significantly to more analytic approaches of reflection (Korthagen, 1993b).

In section 3.2 we will return to this list of tools and strategies when the new tool of telematics will be discussed.

2.2 A new tool: telematics

In this section we discuss the uses of telematics. Here we take a broad perspective on the use of telematics in education. In section 3 we will focus on the use of teleguidance for the promotion of reflection in teacher education.

Three major types of telecommunications
A survey of recent activities and projects related to the educational uses of telecommunications technologies in Europe (Veen et al., 1994; Collis et al., 1993) identifies three separate major types of telecommunications. They relate to the interaction of the participants involved.

1. 'one to one' communication, such as computer mediated communication or electronic mail.
2. 'one to many' communication, such as dissemination of courses through distance learning.
3. 'many to many' communication, such as information handling through educational networks.

'One to one' mode of telecommunications

Electronic mail is the most simple but, also the most widely used mode of telecommunications. E-mail requires small bandwidth technology, is most frequently text-based and as communication it is asynchronous, not requiring participants to communicate simultaneously. This favours teachers and students for whom it would be impractical to communicate in real time during school time. Its relative simplicity is also its strength. Using copper wire telephone lines, e-mail is available to the average educational institution and private home with modest hardware. But the success of this medium not only depends upon the hardware. The software that will be used and the ongoing support during activities through an intermediary such as technical assistants, have proved to be crucial.

'One to many' mode of telecommunications

An example of the 'one to many' mode is the use of telecommunications for distance learning. Technology enriched distance learning has been considerable in the field of adult education. An experienced teacher education institute is the Open University in the UK, which launched its preservice programme (PostGraduate Certificate for Teacher Education) in 1994. The OU is using telecommunications for inservice training courses and professional development as well. The success of the programme has lead to an increase in numbers, approximately 1700 student teachers per year in 1996. The rather recent OU experiences show the need for training of full-time and part-time staff working within the programme.

However, the experiences with telecommunications in traditional teacher education institutions have been limited. Those reported use a combination of face-to-face contacts and e-mail for computer-mediated communication of homework assignments and written reports.

'Many to many' mode of telecommunications

Information retrieval through educational networks is the usual mode of 'many to many' telecommucation. Educational networks appear to exist in a wide variety of geographical, functional and organizational structures. Bulletin board systems (BBS) set up by universities, teacher centres, or governmental authorities, may be organized at a local, regional or national level. Smaller BBS's have been installed for project purposes only and have been closed or not maintained since then.

Most of these have been videotext-based and as a consequence restricted to text alone. Very recently, however, there is a massive shift towards the use of the Internet offering services that include images and sound. In most EU countries more and more different types of service providers offer Internet access and prices are likely to decrease in the next years. This will enable schools and individuals such as students, to be connected to a worldwide network and participate in educational conferencing activities, including desktop conferencing.

Telecommunications and education

Over the last few years, there has been a considerable increase in telecommunications activities in European schools. The current situation is that information and communication technology is most of the time seen and used as *a new tool for students*. The main interest is to teach students to understand and to use new technologies. As a consequence a new category of teachers within the school system has emerged whose task it is to teach specific skills in relation to information and communication technology.

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There is a major distinction between the description of the way information and communication technology is used in practice and the ideas concerning the uses of telecommunications for educational purposes. Several authors stress the necessity of other conceptions of the uses of telecommunications. One of these is the use of telecommunications as *a new tool for teachers* related to the professionalism of teachers. Collis, Veen, De Vries (1993) identify issues related to teachers as professionals who communicate and work with colleagues, take advantage of inservice training in part or wholly available on-line, and have access to teaching materials and other resources for lesson preparation.
Telecommunications for professional development of teachers is related to the abolishment of the isolation of individual teachers (Russett, 1994). This is also relevant for teachers in countries where face-to-face communications are not hindered by physical distances. Communicating with colleagues, even those in your own town, offer new opportunities and ideas. This argument applies even more when teachers actually start to use telematics in their classrooms, thus developing an international dimension to their teaching and opening up their classroom to Europe or beyond.

A second conception of information and communication technology is that it is *a new teaching tool*. In this view, information and communication technology is an integrated part of the existing educational practice. Watson (1993) refers to several examples, mostly language courses.

A last conception is that information and communication technology is *a new educational tool* that will lead to fundamental changes of the educational system. Expected results will be new forms of teaching and learning implying new educational paradigms, new teaching methods and changing interpersonal behaviour. Lecturing will become inappropriate for teaching students how to learn, how to deal with information or how to collaborate with peer students. Instead of the ever knowing expert, teachers will become tutors offering learning experiences and advising students on how to proceed.

Subject-related pedagogy is also at stake. For example, in modern language teaching, traditional approaches evolve into approaches emphasizing communicative skills, including writing skills. The teaching of humanities will evolve into approaches that will include the uses of authentic sources of information from databases and from individuals as well.

The various conceptions of telecommunications as a multi-functional tool for education play an important role in the discussions concerning the introduction and use of information and communication technology in the educational system. Rapid technological changes will continue to offer new opportunities and demand flexible responses of the educational systems, which until now have proved to be very resistent to change. Nevertheless, the role of information technology in the curriculum should be reconsidered every three or four years and potentially adjusted according to up to date technological opportunities and related to newly developing subject-related pedagogy. Instead of being a new tool, new technologies might well become the engine of educational change in the foreseeable future.

3 Reflection and teleguidance in teacher education, design and results of a literature search

In this section the design and the results of the literature search into the use of telecommunications to promote reflection in teacher education are described . First, we will present the design of the literature search (3.1.). The results are presented in three parts: general issues concerning reflection and teleguidance (3.2.), results of evaluation studies (3.3.), and descriptions of current projects (3.4.). The chapter ends with a short summary of the most important conclusions on "the state of the art" in this field, as derived from the literature search, followed by a discussion of these results (3.5.).

3.1 The design of the literature search

The literature search focused on the issue of using telecommunications to promote reflection in teacher education. First, we used the ERIC-database, the most extensive database of literature concerning educational research. Another source was Adion, a Dutch database. In addition a search was carried out on the World Wide Web. We also scanned some relevant professional journals.

The basis of the search design was the construction of a list of relevant keywords, such as 'reflection', 'critical thinking', 'teacher education', 'telematics', 'teleguidance'. The first activity was testing the usefulness of each keyword. The result of the exploration in the ERIC database was that most of the selected words are effective to generate a large number of 'hits'. The keyword 'reflection' even produced 6612 hits; 'teacher education' generated 4817 hits. Only the keywords concerning the technology did not lead to very positive results. After a few attempts using related keywords, such as 'innovation', 'computer', 'information technology', the words 'telecommunications' (1725 hits) and 'electronic' (2879) appeared to provide the best outcomes.
The next search assignments focused on the combination of keywords. After several runs with different combinations of keywords, the result was 42 references concerning literature in our domain of interest.
However, some of these references appeared in more than one search assignment. The final result was 33 references. Many of these references appeared to be internal reports, conference papers or other forms of unpublished literature. In addition, some publications appeared to be not relevant for our study. The search in the Dutch database, Adion, did not generate valuable hits.

Another element of the search was the exploration of the World Wide Web with the same keywords. One of the search tools used, was Altavista, with which the IVLOS-institute has had good experiences so far. The result was a large number of interesting sites, that each had to be examined before a judgement could be made. This was a time consuming activity but in this field, which shows rapid developments, it was an effective way to get an idea of the state of the art. Besides Altavista, two other search tools, Yahoo and Webcrawler, were used.

We not only used electronic databases for our literature search. We also scanned the following European journals: The European Journal of Teacher Education; Teachers and Teaching, Theory and Practice; Teaching and Teacher Education; Educational Technology.

3.2 General issues concerning reflection and teleguidance

The general picture offered by the literature is that research on reflection is generally carried out by analysing data from sources meant to stimulate reflection such as log-books, recorded supervision meetings, interviews and other qualitative data sources. In this respect telecommunications is seen as a new aid to help student teachers to reflect on their teacher behaviour. During schoolbased components of teacher training programmes, telecommunications facilities offer opportunities for individual student teachers to share their experiences with peers, get responses and communicate more frequently with their teacher educator. Telematic facilities might contribute significantly to the enhancement of reflective skills of student teachers.
However, one of the incentives for the inventorial study reported here, was the fact that until now studies on reflection and teleguidance are scarce and little evidence is available on the learning effects of the use of teleguidance in teacher education. There are indications from the literature on distance-learning that teleguidance might be effective. In many situations, especially if distances between the university and the school where the student teachers work are great, teleguidance may be one of the few means of contact with the teacher educator.

Referring to the discussion in section 2.1 on reflection, one might ask how teleguidance relates to strategies for promoting reflection in student teachers. The use of teleguidance can be seen as a combination of strategy 2 and 3: the student externalizes his or her reflections on teaching experiences and is stimulated by those from others (a teacher educator or peers). In addition, teleguidance could help to develop feedback procedures for individual teachers, showing them at a concrete level how to evaluate their actual reflections.

If student teachers react to each other's reflections by means of telematics, an interesting factor becomes apparent, viz. the role of *reciprocal teaching* in learning processes (Von Wright, 1992; Brown & Palincsar, 1989). By reading the reflections of colleagues and by thinking about how to react, one's reflection on one's own experiences as a teacher are strongly stimulated. As Von Wright puts it: "Trying to understand another person's point of view forces one to reflect on one's own." Von Wright presents the following explanations for this effect:

- first one has to decide what there is to be explained or taught.
- secondly, one needs to consider what those who are taught know and understand already.
- thirdly, one has to assess how one's own teaching is interpreted by the others.

Von Wright also mentions the advantages of social support and shared expertise.

Wolcott (1995) presents a quite negative image about the possibilities of the use of telecommunications. In his article he discusses four topics: the interpersonal distance, the amount and frequency of interaction, the feedback in interaction and interferences in message transfer. In his opinion the result of the use of telecommunications will be

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an increase of the interpersonal distance. This refers to the decrease of feelings of psychological closeness as one moves from an information rich environment, such as face-to-face interaction, to an information environment where sensory channels have been reduced. Wolcott states that the amount and frequency of interaction will decrease. In relation to the feedback in interaction processes, Wolcott refers to the absence or reduction of nonverbal communication, such as eye contact and body language. His conclusion is that without nonverbal cues and with feedback diminished, there is a greater likelihood that messages may be misinterpreted.

Wolcott's view may be right if the objective of the use of telecommunications is to substitute the existing educational practice. Although in theory this is a possibility, in practice the introduction of new technologies often implies that new opportunities to act are added. In relation to reflection the result of using telecommunications can be the decrease of the interpersonal distance. This situation can occur in cases where the possibilities of communication are limited, because of the existence of a physical barrier.

Davis (1995) stresses that e-mail messages rarely take the form of well presented letters: "Instead it is more like a conversation written in notes. Many users accept that spelling and grammar are irrelevant and that a speedy response can later be followed by a reflective one, when necessary. The difference with a regular discussion is that thoughts become text. Once the thoughts are fixed, they can be examined. "From a research perspective this can be an advantage. Although some researchers have concluded that oral discussions offer more valid data about the internal reflection processes of individuals than logbooks and other written materials (Hatton & Smith, 1995; Van Zoest, 1995), it is often not possible to analyze the complex and vast data from transcripts of group discussions and analyze each participant's personal reflection processes within the group. In this respect, group telematic applications on the one hand offer the advantage that they may come close to oral discussions, while on the other hand the content of the discussion and each participant's personal contribution can be more easily assessed by analyzing the electronic data.

3.3 Results of evaluation studies

In the literature there are only a few projects that have been evaluated. A difference between these projects is the way the main concepts, reflection and telecommunications, are connected. Three theoretical frameworks can be distinguished.

First, the use of telecommunications can be seen as an incentive for reflection on one's own teaching. According to Wolcott (1995) who concentrates on distance teaching, telecommunications challenges one's routine approach to teaching. He presents some kind of meta-evaluation of research on this topic. He states that reflection in relation to the use of telecommunications is necessary on context, learners and methods. Reflection on context is essential because the teaching environment takes on a new complexity. In addition, distance teachers should ask themselves questions such as: What are my expectations of this delivery medium? Reflection on learners is required because students are separate from the locus of instruction. Reflection on methods is needed because it is not safe to automatically apply preferred face-to-face techniques.

Although the study of Hatton and Smith (1995) has a more descriptive than evaluative character, it is worthwhile mentioning, because they have developed an interesting categorisation of reflection. On the base of their analyses of the reflective writings of student teachers they distinguish (1) descriptive writing, which is not reflective as it involves no attempt to provide reasons or justifications for events or actions; (2) descriptive reflection, which shows attempts to provide such reasons or justifications, but still in a reportorial or descriptive way; (3) dialogic reflection, demonstrating 'a stepping back' from the events or actions, leading to a different level of mulling about, discourse with oneself and exploration of the experience, events, and actions, using qualities of judgements and possible alternatives for explaining and hypothesising; (4) critical reflection, demonstrating an awareness that actions and events are not only located in, and explicable by, reference to multiple perspectives, but are located in, and influenced by multiple historical, and socio-political contexts.

A conclusion of Hatton and Smith's (1995) is that there are differences between reflection processes apparent in group discussions and the written texts from participants. Some people show a high level of reflectivity in such discussions, but are not inclined to write much in their logbooks. Telematic aids may offer such students a more attractive alternative. In this context, the research of Newman, Webb and Cochrane (1996) can be referred to, because they have compared face-to-face learning processes and computer teleconferencing in general. They found evidence for critical thinking, both in the conference and in the regular seminar. Although similar depths of critical thinking occurred, there were differences. In the face-to-face seminars more new ideas emerged. At the same time, more important statements were given and more ideas were linked in the computer conference.

In the second theoretical framework, the assumption is that there is a direct relation between the use of telecommunications and reflection.
In this context, it has to to be said that beside this similarity there are also essential differences in the conceptualisation and operationalisation. In the study of Veen, Lockhorst and Korthagen (1995) the frequency of communication between student teachers and their supervising teacher educators is one of the indicators of reflection. Another indicator is the degree to which student teachers share their experiences with their peers, discuss specific questions and get responses to their inputs. A conclusion of this study is that the reflective skills of all the student teachers developed significantly during the five-month period of schoolbased training. The study showed a development in which the student teachers started with the description of disciplinary problems, which gradually evolved towards the structured description of pedagogical concerns. An unanswered question for the researchers is if this result is due to tele-tutoring. They state that such a conclusion can only be drawn if the evaluation is based on an experimental design with a control group, measurement before and after the stimulus, and a random selection of respondents.
An important result the researchers report on, is that a frequent exchange of experiences with peers at other schools took place. Another result is that student teachers received emotional support from fellow students. An unexpected result is that the use of telecommunications is more time-consuming than was planned. The overall conclusion is that tele-tutoring is an effective means to promote the learning process of prospective teachers.

A similar study has conducted by McIntyre and Tlusty (1995). They see electronic mail as a promising strategy to encourage reflection among student teachers. The presumption is that this medium can overcome many of the practical constraints of the usual journal. McIntyre and Tlusty conclude that e-mail provides a vehicle for student-teacher discourse, that can promote reflection. However, they present little evidence because of the limited number of student teachers participating in the research.

In the third theoretical framework, researchers assume that there is an indirect relation between the use of telecommunications and reflection. In that case an intermediate variable is distinguished complementing the framework. Harrington (1992) introduces the variable non-dominated dialogue. In her view, an advantage of the application of telecommunications in comparison with face-to-face discussions is that each voice is assured equal value. "The opportunity that computer conferencing provides to focus on what is said, rather than who says it, takes power away from the quick, articulated responses that often dominate classroom discussions." (Harrington, 1992, p.72). This is realised by giving anonymous identification numbers to the participants. Another advantage, she mentions, is the amount of time. Computer conferencing provides student teachers with more time for reflection. The assumption is that in classroom discussions the opportunity to think through the consequences of others' opinions is more restricted. Besides this advantage, computer conferencing enables student teachers to confront different points of view.
In the project the attention is focused on three issues: openness to other perspectives, consequences of action and increasing the awareness of taken-for-granted assumptions. One finding is that students acknowledged other individuals' perspectives. In addition, the discussion was never dominated by any particular participant. Another finding is that student teachers are aware of the potential consequences of particular choices. A last finding is that student teachers began to question some taken-for-granted assumptions. At the same time, the more deeply held assumptions were not so often discussed. Harrington's conclusion is that computer teleconferencing appears to have potential for improving reflection of student teachers. In spite of this some questions have remained unanswered. One of the main questions is the relationship between teleconferencing and taken-for-granted assumptions.

In another research study in cooperation with Hathaway, the variable of 'awareness of taken-for-granted assumptions' plays a central role. In the view of Harrington and Hathaway (1994), the existence of these assumptions are an obstruction to student teachers in their efforts to reflect critically. In this study teleconferencing is also seen as an instrument to establish a non-dominated dialogue: the advantage for promoting reflection is that the power imbalance found in most classroom discussions can be lessened and a freedom of expression can be encouraged. One of the findings of this study is that the dialogues between student teachers are a rich source of taken-for-granted assumptions. From an educational perspective it is a problem that student teachers do not acknowledge these assumptions. Another finding is that the student's level of development appears to be related to his or her ability to identify and clarify taken-for-granted assumptions.

In Blanton's model (1993), the intermediate variable is the establishment of a virtual community of student teachers and university supervising professors. The idea is that through the use of telecommunications an electronic network can be created. This can solve the problem of poor communication between the members of the student teach-

ing triad (university supervisor, cooperating teacher and student teacher). A frequent result is a lack of understanding of each other. In addition, student teachers seem to lack opportunities to engage in reflective activities. In this respect telecommunications is potentially a powerful tool for creating the social context for active, goal-oriented professional behaviour. It removes the boundaries of time and distance in communicating.

In Blanton's view, telecommunications may enable participants to:"
(1) reflect on their learning,
(2) use writing as a tool for both communication and thought,
(3) constitute social structure for the critical analysis of teaching and reflection,
(4) communicate about jointly addressed teaching problems,
(5) mediate activity on learning to teach at distances in non-real time,
(6) compare experiences with others,
(7) access networks and information sources,
(8) interact with specialist,
(9) and to become less isolated."

In this project the electronic network is used together with traditional supervision. After a description of several dialogues among the participants, Blanton states that a socially organised group can offer both support and advice. Blanton emphasizes the possibility of receiving more answers to a question. In the current situation a student teacher gets an answer from one person. As a result the process of the construction of meaning takes another course. At the same time the use of telecommunications serves as a self-help device to student teachers. Although in his view the results are promising, he states that it is too early for conclusions. He advocates a further exploration of the possibilities of this technology in this area.

In spite of the fact that the research by Anderson and Lee (1995) is not focused on student teachers specifically, we want to refer to the conclusions of their study. One of their most important findings is that electronic mail plays a major role in building a sense of community in a graduate reading class. The use of the technology facilitates the sharing of ideas and resources, encourage risk taking, helps students to reflect on their learning and stimulates cooperative learning. Problems they have encountered, concern the accessibility of computer software and student frustration with software.

A last evaluation study belonging to this third theoretical framework has conducted by Thomson and Hawk (1996). They present a similar, but less theoretical variable: the increase of support for student teachers. The problem is that beginning teachers benefit less from supervision and assistance than is desirable. This is due to the fact that a teacher is both mentor and evaluator.
An improvement can be achieved by giving a university professor the role of observer. The collaboration among the members of the support team can be realised by using videotape technology and teleconferencing. The design of the evaluation study was experimental. The 23 members of the experimental group videotaped themselves and the members of this group were provided with feedback by university teachers. The material the university supervisor had at his disposal, was: a mailed tape of a lesson, a self-evaluation of the lesson and the lesson plan. After observing the tape and studying the writings a computer conference was held. The control group followed the normal programme. The only involvement of the control group in the experiment was that

they had to fill in a questionnaire. The questions had been formulated in such a way, that it appeared that these student teachers were participating in the experiment.
The result is that in most cases the scores of the experimental group in comparison with the control group are higher. This concerns issues like: support was helpful, the school system was supportive, the university professor was/would have been helpful, videotaping was/ could have been helpful, mixture of feedback is desirable for student teaching.
A problem in the analysis is that the scores of the measurements in the experimental and the control group are difficult to compare. In spite of this the researchers conclude that the participants seem to agree on the belief that telecommunications is an alternative to traditional face-to-face conferencing. It is an extra source of information which helps to promote reflective teaching.

3.4 Current projects

In the literature and on the Internet, projects have been found that are in the implementation stages or have not yet been evaluated. As a consequence, only a description of these projects can be given, without presenting their results. Nevertheless, it is worthwhile to discuss some of these projects.

European projects
An interesting Finnish project is called the HAAVE project. The main goal is to reduce the gap between theory and practice in teacher education and to integrate and renew primary teacher education by developing its contents, methods and organisation. In this project the used methodology is action research. One of the main issues is to make "teachers familiar with reflection and research of their own work and its ethical and critical examination" (Haave, 1996). Another topic is to advance professional growth by developing distance education and guidance. In this respect, the use of new technology, such as electronic mail, is one of the means. A limitation of the presentation of this project is that no conceptualization and operationalisation of the leading concepts is given.

In a second Finnish project, the objective is to investigate the possibilities of promoting reflection defined as "open and analytic attitudes towards his/her teaching activities and self-development" (Atjonen, 1995). It is out of the range of this report to discuss this project in detail, because in the project slightly different modes of information and communication technology are used.

Besides the described projects, there are two other potentially interesting projects. First the Italian project entitled 'TEletutoring Milano POlitecnico' (T.E.M.P.O). Although the homepage looks promising, the supplied information is too limited to gain an good impression of the project. This is a problem which occurs more often, when one is surfing on the Internet. The second project is 'Multimedia teletutoring over a Trans-European ATM network'. The problem with this project is that on the homepage the title of a paper is presented, but this is not accessible. The required command to decode is unknown.

American projects

At the Northern Arizona University a project is being started aiming at student teachers and first year teachers (Gunn, 1996). The communication medium is the Arizona K-12 network connecting many schools in the area. A small group of student teachers use the network for reflective journaling during their student teaching semester. They are requested to send lesson plans to their university supervisor prior to an observation visit. Next an electronic discussion for feedback takes place. So far, the experiences are not really positive, because of technical problems and difficulties with getting access to the network.

A finding of this project is that there is a difference between the communication with student teachers and first year teachers. The reflection of first year teachers appears to be at a deeper level. The messages concern the need for resources, specific questions on how to bond with other teachers in the school. The tone is more desperate than that heard by student teachers. The student teachers 'talk' about how existing teaching is and how scared they are. In their writings little reflection is seen on the teaching process.

The overall verdict is that the use of telecommunications *can* be worthwhile. At the same time it is acknowledged that the project will only become a success if network access will be improved. In addition, more experience is needed to draw final conclusions about the value of distance guidance.

In another American project, a course is offered in which teleguidance plays an important role. The underlying assumption is that teachers able to reflect on their practice are those most likely to continue to develop professionally and to derive satisfaction from their work. The approach is case-based instruction, because it encourages reflective practice and deliberate action by permitting students to discuss and choose among competing interpretations advanced by recognized professionals and by one another. The advantage of using cases is that they bring slices of real life into the classroom, and the cases expose students to settings and contexts that would normally not be available.

The course is divided into two segments. The first seven sessions are devoted to providing students with guided practice. The last seven sessions are concerned with cooperation in case analysis within Web-sites. The construction of cases can be used to facilitate communication among the participants on the Net.

After students have completed the course they will have opportunities for contact with one another and with course instructors via a discussion group.

Discussion lists

Besides the report descriptions, another interesting information source are discussion lists. Although the relevance of the presented material is rather limited for our study, it is still worth mentioning. One example of a relevant European discussion list is the BEE-net for beginning English educators (BEE, 1996). This is an electronic forum in which student teachers and teachers of English at elementary, middle and secondary schools conduct conversations across the country and participate in the kinds of interactive, reflective discussions that contribute to professional development.

Another example, although based in the U.S., is the initiative of the Centre for Critical Thinking in the United States, which offers 'electronic visitors of the home page' the opportunity to leave an e-mail message or to start a discussion. (Sonnema, 1996)

3.5 Conclusions and discussion

One of the main conclusions of the literature search is that the outcome is not overwhelming. Only a few descriptions of experiments and pilots are found, mostly on Web-sites on the Internet. An indication is the number of hits in the ERIC Database Search. Individualy, each of the keywords results in a great number of references. The outcome of the search with combinations of keywords does not result in many relevant references. Several projects are in their implementation stage. Only a few articles are found in which the results of evaluation studies are described. This implies that little progress has been made since the beginning of this decade, when Harrington and Hathaway (1992) reported that no studies concerning the use of telecommunications in relation to critical reflection had taken place.

The few studies generally show a positive view of the possibilities of the new medium, but until now few concrete indications of helpful ingredients of an approach aiming at the promotion of reflection are known. In addition, there are major differences between conceptual frameworks. Some authors presume a direct relation and other authors an indirect relation between the use of telecommunications and reflection. This can have a major influence on the research results. Another difference concerns the operationalisation of the concept of telecommunications and the frequency of the use of telecommunications in particular. In most projects, there is intensive communication between participants, but there are evaluated projects in which hardly any interaction took place. This can also have an impact.

In this respect we are confronted with a relatively blank spot on the research map, which is rather alarming given the rapid developments taking place. Moreover, it has to be remarked that in the different projects the emphasis is put on outcomes and not on process. As a result little or no attention is paid to issues that are stressed in the literature about technology and technological developments in general, such as learning processes or conflicts among participants. In addition, it is of importance whether telecommunications is defined as hardware only or as a combination of technological, social and individual circumstances. The success of the implementation of telecommunications depends in the end on the user and his learning potential in relation to the technology.

An interesting but often neglected topic in the different projects is whether the use of telecommunications to promote reflection is focused on substitution of the regular supervision and guidance practices in teacher education or whether it is meant as an additional strategy. In theory both options are possible. In practice, the option of substitution is at least questionable. A combination of traditional strategies to promote reflection and the new tool seems to be a more logical outcome. In this respect it is remarkable that such a combination has not yet been investigated.
At this moment we can only state that telecommunications is a potential tool to promote reflection. An advantage of telecommunications can be that it is asynchronous, which means the communication is not bounded to a certain time or place. Another advantage can be that it is an alternative to face-to-face interaction because of the absence of a physical barrier.

4 The survey: design and results

In this section we present the design and results of the survey. The design is discussed in 4.1. In 4.2 we take a first look at the response to the questionnaire. In 4.3 we look more specifically at the relation between reflection and telecommunications. In 4.4 the organisational structure of the projects is analysed. Section 4.5 deals with the results of the projects.

4.1 Design of the survey

The objective of the survey is to take inventory of the initiatives of European institutions of teacher education concerning the use of telecommunications to promote reflection. In this respect an important decision has been not to focus the entire questionnaire on the inventory of initiatives concerning the use of telecommunications to promote reflection. In the opinion of the members of the research group this is a too restricted approach, probably leading to a very low response to the questionnaire. As a consequence, questions concerning initiatives in relation to just reflection or just the use of telecommunications have been added.

An advantage of broadening the questionnaire is that respondents with no experience in stimulating reflection in combination with telecommunications can also express their interest in this topic. In this respect, we distinguish four categories of respondents. The first category contains members of institutions employing activities, research or experiments in relation to the use of telecommunications **and** reflection. The second category includes people only active in the area of reflection. The third category is related to the use of telecommunications. The fourth category contains members of institutions who are perhaps interested in the uses of telecommunications to promote reflection, but do not display any activities.
The addressee can himself decide to which category he belongs. He or she then answers the questions related to the chosen topic. Besides these specific questions, each of the respondents is asked to answer a few general questions concerning cooperation between institutions. The objective is to locate possible networks of researchers. In this way, it is possible to spot partners for participation in future collaborative research, in order to enhance the European dimension of activities of the present partners in the project.

The questionnaire is semi-structured. An advantage of this type of questioning is that the respondents have the opportunity to express their views on the subject without being pushed into a specific direction. In addition, it is rather difficult to develop a more structured questionnaire, because of the existing different views on the meaning of reflection.
Compared with an open questionnaire, an advantage of the semi-structured questionnaire is that the analysis of the answers can take place in a more structured way.

The theoretical population of this survey are teacher education institutions across the European Union. The four partners of the REFLECT project are not included in the

population. On the other hand, the questionnaire has been distributed to institutions in Iceland, Norway and Switzerland. The operational population of this study is the list of institutions mentioned in the ATEE guide (Buchberger, 1992). The size of the population is 700 addresses.

A specific problem was that the addresses of the institutions are available, but not the names of its members doing research or other activities concerning reflection and telecommunications. If a person's name is in the ATEE-book, this name is used as an addressee. However, this is more the exception than the rule. In most cases, no name is given. For these institutions, we have used a general description; the questionnaire is addressed to 'the head of the department'. A problem with the addresses of German institutions in the ATEE-handbook is that only the names of the universities are given without any reference to a specific department. The chosen solution is that we have added to each address 'Fachbereich Lehrerausbildung' (Department of Teacher Education).

4.2 Response to the questionnaire

On March 13, the response is sixty-four reactions, almost ten percent of the population. After that date, we have still been receiving questionnaires. These have not been analysed yet, because this report has to be finished by the end of March.

We have received a reaction from all members of the European Community, with the exception of Denmark. Furthermore, institutions in Norway, Iceland and Switzerland have been sent the questionnaire. As a result, 16 countries have answered. Countries of which the number of reactions is above the average, are: Belgium (12), Germany (6), the Netherlands (11) and the United Kingdom (12). The response from Sweden is 4, the avarage response per country. The other countries have sent less than the average number.

The total response can be considered low in comparison with the 'normal' amount of reactions to a survey. It can also be said that the response is quite high, if the assumption is that only those members of institutions have reacted that are really interested in activities concerning reflection and telecommunications. An indicator of the specific character of the response is that all respondents do ask for information about the REFLECT project. Members of other institutions will have had no incentive to respond. In addition, if they would have filled in the questionnaire they would have had to send back an almost empty form.

The conclusion can be that almost ten percent of the institutions of teacher education of our population are interested in the use of telecommunications to stimulate reflection.

Categorisation of respondents
The design of the questionnaire is such that each respondent can choose one of four distinct categories. Twenty four respondents have classified themselves in the category reflection **and** telecommunications. After a first and quick analysis of the responses, the problem has emerged that the classification of the respondents does not always correspond to their general description of their project. Some respondents have placed

themselves in more than one category. One of the problems is the confusion in the conceptualisation of the main concepts. An example is that one of the respondents did not know if the use of a closed TV-circuit can be viewed as a mode of telecommunications. Another problem with the classification is that two respondents are involved with activities concerning reflection and the use of telecommunications, but these are carried out as separate activities.

The decision is taken to re-classify a respondent if there is a well-founded reason. One of the main reasons to recode was that a respondent expressed his doubt concerning his own classification. Those respondents have been classified on the basis of the definitions in this report. Another reason was that the provided information was too limited. In those cases it was not possible to analyse the relation between reflection and the use of telecommunications. In this context we have undertaken additional actions to improve the quality of the response by sending e-mail messages to the respondents. In a few cases this resulted in the provision of extra information.

The classification of respondents is given in table 1. The most important changes concern the cell of reflection and the use of telecommunications. Eight of the 24 described projects have been recoded. Furthermore, a new category has been introduced: reflection and telecommunications as separate activities. This concerns two institutions, one in the Netherlands and another one in the United Kingdom.

		reflection		
		yes	no	**total**
use of telecommunication	yes	16	5	21
	no	19	22	41
	total	35	27	62

Table 1: The distribution in categories after recoding

In this context, it is worth noting that three respondents classified in the category reflection, are considering to start using telecommunications on a experimental basis. One institution starts a project with twenty five cooperating schools next year.

On the basis of this categorisation it is possible to show an overview of the kind of projects per country (see table 2).

The number of reactions of the different countries is too low to draw conclusions about the distribution of projects. Nevertheless, some interesting obversations can be made. Belgium, the Netherlands and the United Kingdom are the countries, which are undertaking the most activities. In the Netherlands the emphasis is on reflection only. In the project conducted by institutions in the United Kingdom reflection and telecommunications is stressed. In Belgium both reflection and telecommunications and reflection only are topics. If the total response is compared, the statement can be made that institutions of Belgium and the United Kingdom are more interested in the

use of telecommunications to promote reflection. The greatest response of institutions that do not employ activities, but do want information, has been recieved from these countries.

Country	Reflection and telecommu-nications	Reflection	Telecommuni-cations	None
Austria			1	
Belgium	3	3		6
Finland	2	1		
France				2
Germany		3		3
Greece				1
Ireland		2		
Italy	1			1
Luxembourg	1			1
Netherlands	2	6		2
Norway	1		1	
Portugal			1	
Spain			1	1
Sweden	1	3		
Switzerland		1		
United Kingdom	5		1	5
total	16	19	5	22

Table 2: Projects in the different countries

4.3 Relation between reflection and telecommunications

The conclusion of the literature search that reflection is an ill-defined concept, can be confirmed on the basis of the survey. Only five respondents, with projects concerning reflection and telecommunications, have given a working definition of reflection. The reason most often mentioned not to give a definition is that in the respondent's view it is irrelevant. Other reasons are: still working on a definition (2), the use of the term reflection depends on the circumstances (1).

If implicitly a definition was given, it was not very specific. One respondent mentioned only the term 'reflective practitioner'. Another respondent states that only criteria, such as specified goals, explicit action and experiences, are used to check whether students reflect. The third respondent refers to different definitions being discussed. These are:

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-"The ability to go beyond the information given"
- "Reflection about the student's own learning-processes and processes in teaching practice especially in arts-education"
-"Reflection about the student's own language and the use of language in different situations"
-"Reflection about aims and assessment from a pedagogic point of view".

Only two respondents have given a more specific and consistent definition. The first definition is: "the systematic analysis and evaluation of experiences, thoughts and activities concerning education." The essence of the second definition is: "a teacher should continuously think and rethink his activities." Of the projects concerning reflection only 50 percent appears to have a working definition of reflection (see appendix 4).

A better understanding of the concept of reflection can be accomplished if the objectives of the conducted projects are compared. Here, two types of relations between reflection and telecommunications can be distinguished. The first type resembles the ideas of the REFLECT project, in which reflection is defined as: *the mental process of trying to structure or restructure an experience, a problem or existing knowledge or insights.*
This representation of reflection in relation to telecommunications can be found in four projects. In the other twelve projects, the relation between reflection and telecommunications is depicted in another way. In those cases, the emphasis is not put upon the reflection of student teachers, but upon the curriculum and the role of telecommunications in the educational programme in particular. The difference in conceptualisation can be characterised as the distinction between a student-oriented definition of reflection and a curriculum-oriented definition.

Student teacher oriented definition of reflection
Two out the four projects give a short description of their project. A British institution considers using telecommunications in the near future. In the current courses the emphasis is upon reflection. A Belgian project gives as its objective to support student teachers learning to learn.

Two Finnish projects are more detailed. An important aspect of one project is the establishment of a Didactic Process Laboratory (DLP). The heart of the DLP is a studio, where pupils and teachers can be engaged in their tasks. The equipment for gathering data are video-cameras and a few computers with special programmes for observing the lessons. Another facility is a network. In this project, the conceptualisation and operationalisation of the concept of reflection is based upon the work of Dewey. The essence is that student teachers should think and rethink their activities.

The objective of the DPL-project is to promote open and analytic reflection. Open reflection is focused on the encouragement of novice teachers to carry out self-evaluation directed towards the future instead of just assessing the past tasks or lessons. Analytic reflection refers to the results of reflection. A student teacher has to pay attention to both personal opinions and theoretical principles, rules or norms.

The second Finnish project concentrates on the metacognitive processes of student teachers. The objective is that in the end student teachers will have to be able to

recognise and evaluate their learning processes and reflect on their professional practices. The concept of reflection in this project is based on the work of Vygotsky, in which the assumption is that teaching is a social phenomenon. In this context a cyclical model has been developed based on the notion of seeking and formulating the learning problem of the student teacher, abstraction and reflection. An important activity in this process is discussing their individual learning problems with peers and the supervisor.

Curriculum oriented definition of reflection
A feature of these described objectives is the attention paid to the curriculum. The specific role of telecommunications in these projects is that it offers new possibilities to improve, extend or change the existing programme. Despite the differences between the descriptions several clusters of objectives can be distinguished.

The first cluster concerns the development of a learning and teaching environment. An example of such an objective is: "develop collaborative multimedia, telematic learning environment". The description of one of the projects illustrates that the scope of curriculum oriented reflection can be enormous. The mentioned objectives concern:
-the organisation, working-methods and content of courses;
-integrating theory and practice in school;
-the use of ICT and teletutoring for learning, communicating and producing;
-integration of pedagogical research into teacher education;
-teacher education in a global perspective;
-the use of reflection as a method for educating professional teachers for the future school and society.

In this cluster a returning topic is the investigation of the possibilities of distance learning. Most of the time this objective is only mentioned. An exception is a British project. The assumption in this project is that "there is a need to provide a flexible range of opportunities for teachers to engage in professional development trough a variety of different learning options, including access to distance learning". The Learning Interactively at a Distance project (LID) has been set up to investigate the potential of using a range of multi-media applications to support and enhance the learning process.

A second cluster of objectives focuses on the the scope of the curriculum. In this context, telecommunications technology is used to facilitate the interaction between the participants. In one project for instance teleconferencing is used to offer student teachers the possibility to follow courses of other universities. Two projects concentrate on the development of European awareness in teaching training. In one project, the intention is to create new teaching materials for teaching literature from an European perspective. In the second project, in which student teachers of history have participated, the use of telecommunications is seen as a possibility to participate in an international learning context without actually being abroad. The essence is that the student teacher can interact with students of another European country. In this case a connection between a Northern Irish institution and a high school in Norway was established. In addition, an objective is to teach student teachers to use telecommunications technology.
Most projects can be placed in one of the two clusters. In some cases a project has more than one objective and can be placed in both clusters. One project focusing on

the curriculum does not match with the mentioned clusters. The objective of this project is developing courseware student teachers can use independently of their supervisor or teacher. The underlying conception of tele-teaching or tele-tutoring is that technology will replace (partially) the supervisor. In this way student teachers can learn on their own supported by technology.

If the different curriculum oriented definitions of reflection are compared, the conclusion has to be that the concept is ill-defined. This can be interpreted in a negative but also in a positive manner. The positive interpretation is that these projects can be seen as the first step in rethinking the existing curriculum. The objective is to obtain some experience on an experimental basis. Next, the results can be used as an input for a more theoretical discussion concerning the curriculum and the role of telecommunications in particular.

4.4 Organisation of the projects

In this section several features of the organisation of the projects are discussed. These are duration, size, collaborative relations with other institutions.

Duration
Projects concerning reflection and the use of telecommunications are a relatively new activity of institutions of teacher education. The first project started in 1994. In table 3 an overview of the year the projects have begun, is shown.

Year	Number of projects
1994	5
1995	2
1996	5
unknown	4

Table 3: year projects started (N = 16)

Although in the period from 1994 until 1996 there is a difference in the number of new projects, the number is too low to draw conclusions. The last project started in March 1996. At this moment, none of the projects has been finished yet. The first project will be finished during 1996. The expected average duration of a project is 21 months. The variation in duration is minor. Most of the projects can be placed in the interval 23 to 29 months.

Scale
Although the questionnaire asks for only the number of colleagues involved, the respondents have given other parameters to express the scale of the project. In table 4 an overview of the most mentioned parameters is given. One of the parameters is the number of institutions, which refers to the participating schools or universities. The

total number of respondents in table 4 is 12; 4 respondents did not answer the question. Empty boxes in table 4 mean that no information was provided.

project	researchers	teachers	students	institutions
1	18			4
2	15	60		
3				11
4		15	90	10-15
5	11	12		
6				6
7		8	30	
8	1	10		10
9	3			
10	1		20	
11			10	
12	5			2
total	54	105	150	43-48
average	7-8	21	37-38	7-8

Table 4: Scale of the projects (N = 12)

The figures in table 4 give only an indication of the size of the projects. The number of projects is too limited to draw conclusions. In the average project 7 to 8 researchers are involved and the number of student teachers educators or supervisors is 21. In an average project almost 40 students participate and 7 to 8 institutions, as schools or universities are involved.

The last parameter is whether the project is externally financed. This is the case for 7 projects. One project receives a contribution from industry. One project is funded by the national government. Five projects are financed by the European Committee. The mentioned departments are DGXII, DGXIII and DGXXII. The relevant programmes are Socrates and Erasmus. Two respondents state that their project is not yet externally financed.

Networks

One of the main questions of the survey is whether the respondents collaborate with colleagues outside their institutions. In table 5 an overview of the number of respondents, who have a network, is given.

		REFLECTION		
		yes	no	**total**
TELECOMMUNICATION	yes	7	1	8
	no	3	5	8
	total	10	6	16

Table 5: Overview of networks

Eleven respondents form a network with collaegues outside their institution. One respondent has only a network concerning telecommunications and three respondents have only a network concerning reflection. Seven respondents do work with other collegues on both reflection and telecommunications.
The eleven networks do not concern the same level. Three networks are national and eight international. The countries with a national network are Finland, Ireland and The Netherlands. Concerning these networks, it has to said that they are restricted. In all cases, the respondents collaborate only with one other institution.

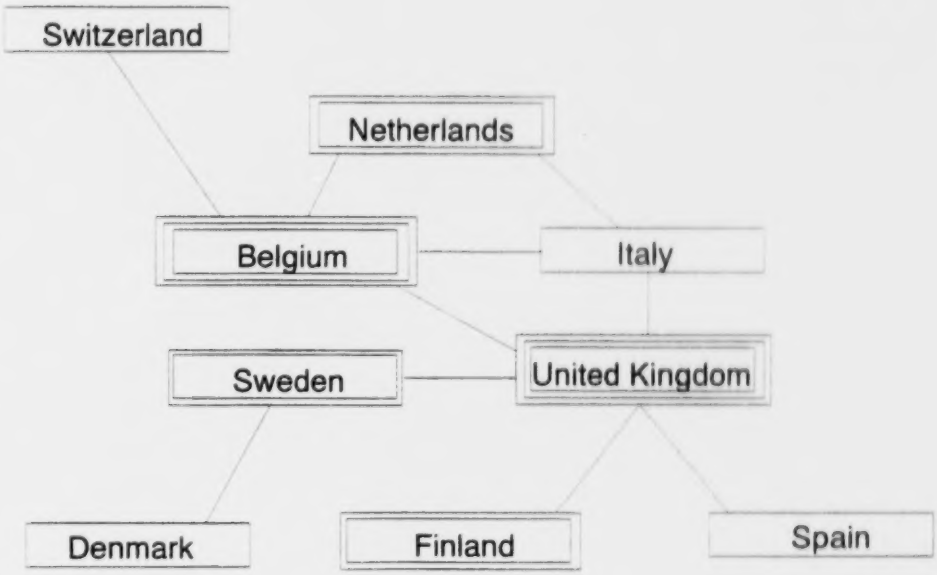

Figure 5: Representation of the international networks

In figure 5 the international relations are described. The centre of these networks contains the following countries: Belgium, Italy and the the United Kingdom. The specific character of the Italian network is that this network is generated by one project. If a country's involvement in networks consist of more than one project, this is represented by the number of added blocks per country. For instance, in the Belgian network, three projects are involved which are not directly connected. Persons, who

have an international contact, often do not have any relation with other people in their country, who have international association.
Sweden and the Netherlands are loosely coupled in the overall network. One of the mentioned Dutch institions has a relation with Italy. Another institution has a link with Belgium. The specific position of Sweden is that this country plays an intermediary role by connecting the United Kingdom and Danmark. The countries on the tringes of the network are Denmark, Finland, Spain and Switzerland.

If in the representation of the international networks, the specific collaboration relations on the topic of reflection are also taken into account, two changes will occur. First, a relation between Belgium and Spain will emerge. Second, there will be a connection between the Netherlands and the United Kingdom. If the specific relations on the topic of telecommunications are included, the network will grow with the following countries: Hungary and Germany. In addition, more associations have to be added. These are the relations between Sweden on the one hand and Finland and the Netherlands on the other hand.
In appendix 3 all the relevant addresses of the projects are listed.

4.5 Results of the projects

Although none of the projects has yet been completed, there are some results. Relevant in this context is that there are differences between the projects concerning the strategies used to promote reflection.

Strategies
The respondents use different modes of telecommunications to promote reflection. In table 6, an overview is given.

modes of telecommunications	one-to-one	one-to many	many-to many	Internet	others	total
number of projects	10	1	7	5	2	25

Table 6: Used modes of telecommunications

The total of used modes of telecommunications is 25. Nine respondents use only one mode of telecommunications. The distribution is: one-to-one (4), many-to-many (2), Internet (1) and two not specified modes of telecommunications. Five respondents have at their disposal two modes of telecommunications. The most mentioned combination is one-to-one (e-mail) and many-to-many (video conferencing). Two respondents use both e-mail, video-conferencing and Internet.

Outcomes

The current situation is that no project has been completed as yet. As a consequence most of the projects cannot report results with respect to content. Respondents describe other outcomes. One example is that results in terms of the progress of the project are formulated, such as:

- kick-off meetings have been held;
- teacher educators play an active role in the project;
- experiments have been started;

Another presentation of results is that subjective judgements are being given, such as:

- the student teachers have confidence in using modes of telecommunications;
- student teachers have lesser sense of isolation;
- student teachers and educators have a positive judgement about the approach of the project.

In some cases, a problem is that the outcomes are published in a language that we do not command, such as Italian. Nevertheless, some respondents provide interesting results. These are not always positive. In a Dutch project focusing on the development of a teacher-independent interactive computer programme, the results until now are rather disappointing. A successful implementation of this kind of technology requires more supportive activities than the members of the project group had expected. As a result, the possibilities of using this application in the institutions of teacher education are decreasing.

In other projects, the results are more encouraging. In a project in the United Kingdom a successful connection between the participating institution and a Norwegian high school has been established. The main objective of this project is to develop a European awareness in teacher training. A specific topic in the interaction is the way the subject, history class, is being taught in another country. In the view of the project leader this is so closely tied to ideological values that comparative analysis is a useful channel for reflection on the purpose and value of teaching this subject.
For the students three important characteristics are identified. First, the student teachers had to think about the appropriateness of the language they were using in the exchanges. Secondly, the students were engaged in some form of cultural interaction. Finally, it gave students the opportunity to experience the use of new technology. In this way they are encouraged to be open to a changing world where global communication will be increasingly important.

In another British project, one of the results is that the use of telecommunications can promote more equal interaction because of the decrease of problems created by assumptions and perceptions associated with gender, race and disability. In the presentation of the outcomes, most attention is paid to the conditions determining the success of implementation of telecommunications systems. For instance, the importance of discussing issues with others experiencing similar problems. In this way the 'reinventing the wheel' syndrome can be prevented. Another condition is that the participants have to be committed to certain rules in relation to the use of the system.

Finally, we will discuss the results of two Finnish projects.
In one project, the main objective was to develop a feedback and supervision system of teaching practice utilizing modern technology. The use of telecommunications is

only a small component of the project. The emphasis is put on information and video technology. Nevertheless, it is still worthwhile to describe this project.
One of the studies carried out in this project concerned an experiment with 21 primary school pupils, 5 teachers and their cooperating teacher educators. The focus was on pupil-centred methods to promote the novice teacher's reflective thinking, pedagogical decision-making and teaching interaction. The essence of the concept of reflection in this project is that a student teacher should continuously think and rethink his activities.
Every lesson was videotaped and observed by three observers utilizing a special computer programme. A feature of this programme is that on the basis of the gathered data immediate charts can be made demonstrating the main pedagogical decisions as a function of real-time. The results indicate that information technology can provide useful material for deeper discussions of novice teachers' own style of teaching. They were able to take the role of an outside observer which promoted their reflective thinking and assessment of different desirable alternatives in organising instructions.

In a project of another Finnish university, attention is paid to pedagogical methods and views of modern cognitive research in relation to the use of Internet. The assumption is that the Information Superhighway will solve the problem of access to information and learning only if it is designed to do so. In this respect a leading concept is the virtual classroom referring to a situation where telecommunications is used to link the members of a course to each other and to their teachers. The essence of the developed model is that a student teacher can be seen as a recognizer and as an understander of his own learning process.
The organisation of the course is that it begins with an orientating task to discover the specific learning problem of the student teacher. The next step is to formulate this problem. The purpose is to give students new ideas about ways of learning, which are based on modern cognitive research. An integral part of the course is that students are reflecting all the time. The importance of Internet in this course is that it has the most current information available. Besides, students learn to ask better questions, to make better arguments, and present themselves more positively. Thus, one of the conclusions of this project is that e-mail can be seen as a very good tool for apprenticeship. Through e-mail students are able to have very personal guidance from teachers. An additional advantage of e-mail for the student teacher is that the information can be saved and can be used as a personal portfolio.

5 Conclusions

In this final chapter, we will summarize the major conclusions drawn from this inventorial study.

1. There is great interest in Europe in the use of teleguidance in teacher education to promote reflection. Responding to the questionnaire, at least 64 teacher education institutions have expressed this interest.

2. The number of institutions themselves actively involved in activities focusing on reflection and teleguidance is much lower, viz. 16. (The 4 REFLECT project partners were not included.)

3. Many of the initiatives on reflection and teleguidance are at a beginning stage. Only 5 projects have been identified that are more than two years old.

4. As yet, there is little evidence and hardly any substantive empirical data available on the effects and effectiveness of the uses of teleguidance in teacher education.

5. The theoretical frameworks underlying the identified initiatives vary to a large extent and need more elaboration. Basic concepts, such as reflection, are generally ill-defined and operationalized.

6. With regard to the promotion of reflection, two major directions can be distinguished, i.e. a student teacher oriented conceptualisation of reflection and a curriculum oriented conceptualisation.

7. Nine countries are involved in different networks concerning reflection and/or teleguidance, viz. Belgium, Denmark, Finland, Italy, the Netherlands, Spain, Sweden, Switzerland, and the United Kingdom. It is remarkable that there is little cooperation between the projects of these countries.

8. Out of the 16 projects focusing on both reflection and teleguidance in teacher education, only 7 institutes are involved in a European network.

9. In order to improve collaboration across EU member states, there is an urgent need to establish a comprehensive European thematic network in this field. Such a network could avoid re-inventing the wheel, at different non-related institutions in Europe.

10. A coordinated agenda for research is needed for those institutions who have expressed their interest in future collaboration in research on reflection and teletutoring.

11. More empirical research is needed into the effects of teleguidance, both for the promotion of student teacher oriented reflection and curriculum oriented reflection. This research should be based on a strong theoretical basis and valid and reliable operationalizations of concepts.

12. The development of a pedagogy of technology-enriched distance learning in teacher education is a blank on the research map. Until now, current projects seem to have focused mainly on technological issues rather than on the nature and quality of teaching and learning processes involved in teleguidance. It is fundamental to the quality of teacher education in Europe that a pedagogy of distance learning be developed.

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